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EXAMINER
SWERDLOW, DANIEL

ART UNIT	PAPER NUMBER
2644	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	08/699,844	DETTMER, DAVID R.	
	Examiner	Art Unit	
	Daniel Swerdlow	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *27 August 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,7-9 and 20-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,7-9 and 20-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Prosecution is reopened in accordance with MPEP sections 1214.04 and 1002.02(c).

To avoid abandonment of the application, appellant must file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 2, 4, 7 through 9 and 24 through 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 claims a duplex portable handset speakerphone. The term "duplex" as used in Claim 1 is misdescriptive. The accepted meaning of "duplex" in the art is "simultaneous two-way independent transmission in both directions" (McNamara, Technical Aspects of Data Communications, p. 362). Applicant's disclosure uses the terms duplex, "full-duplex" (e.g., on page 7, line 34) and "near full-duplex" (e.g., on page 12, line 4) interchangeably to refer to a particular state of operation of the speakerphone which is entered when there is simultaneous speech from the near end and the far end and both signals exceed certain volume thresholds. Generally stated, applicant discloses entry into the "full-duplex" state from the transmit state when the near-end signal exceeds a noise threshold and the far-end signal exceeds the near-end signal (Fig. 6, steps 142, 144). The "full-duplex" state is entered from the receive state when the

far-end signal exceeds a noise threshold and the near-end signal exceeds the far-end signal by a margin (i.e., BothThresh) (Fig. 5, steps 114, 116). The "full-duplex" state is maintained only as long as the far-end signal exceeds its noise threshold (Fig. 7, step 172). Absent these conditions, the speakerphone reverts to the conventional transmit, receive and idle states used in switched attenuation half-duplex speakerphones. Therefore, the recitation in the claims "duplex ... speakerphone" does not distinctly claim the subject matter disclosed. For the purpose of this Office action, the recitation of the term "duplex" in the claims is interpreted to mean, "having a mode of operation, existing under certain conditions, in which simultaneous two-way transmission in both directions can occur".

5. Claims 2, 7, 24, 26 through 29 and 32 through 37 use the terms "duplex" and "full duplex" to describe operation, communication, states and substates. The invention as disclosed operates in this way only under certain conditions. Therefore, the recitations in the claims "duplex" and "full duplex" do not distinctly claim the subject matter disclosed. For the purpose of this Office action, the recitation of the terms "duplex" and "full duplex" when used in the claims to describe operation, communication, states and substates are interpreted to mean "relating to a mode of operation, existing under certain conditions, in which simultaneous two-way transmission in both directions can occur".

6. Claim 2 claims a speakerphone system that uses a codec, microprocessor, and programmable digital attenuators to analyze and alter a signal without digital signal processing. Since the use of these elements inherently involves digital processing of the signal, the claim is internally inconsistent and therefore indefinite. For the purpose of this Office action, examiner assumes "without digital signal processing" means "without adaptive filtering".

7. Claim 4 is indefinite due to dependence on Claim 2.

8. Claims 8 and 9 are indefinite due to dependence on Claim 7.

9. Claims 25, 30 and 31 are indefinite due to dependence on Claim 24.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1 and 24 through 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Barron et al. (US Patent 5,357,567).

12. Claim 1 claims a duplex portable handset speakerphone comprising a microprocessor. Barron discloses a speakerphone system comprising a processor (Fig. 1, reference 115, 160; column 1, lines 40-44) that corresponds to the microprocessor claimed. Claim 1 further claims the speakerphone comprises a hands-free receive register coupled to the microprocessor. Barron discloses an interface (Fig. 1, right side of reference 160; column 3, lines 5-7 and 26-29) that corresponds to the hands-free receive register claimed. Claim 1 further claims the speakerphone comprises a hands-free transmit register coupled to the microprocessor. Barron discloses an interface (Fig. 1, left side of reference 115; column 3, lines 5-7) that corresponds to the hands-

free receive register claimed. Claim 1 further claims the speakerphone comprises a memory circuit having an algorithm executable by the microprocessor for operating the speakerphone. Barron discloses random access and read only memories (Fig. 1, reference 135, 130; column 3, lines 13-15) that correspond to the memory circuit claimed and software (column 10, lines 48-50) that corresponds to the algorithm claimed. Claim 1 further claims the speakerphone comprises a first analog-to-digital converter coupled to the hands-free receive register. Barron discloses an analog-to-digital converter (Fig. 1, reference 165; column 3, lines 45-47) that corresponds to the first analog-to-digital converter claimed and is coupled to the interface that corresponds to the hands-free receive register claimed. Claim 1 further claims the speakerphone comprises a second analog-to-digital converter coupled to the hands-free transmit register. Barron discloses an analog-to-digital converter (Fig. 1, reference 110; column 2, lines 66-68) that corresponds to the second analog-to-digital converter claimed and is coupled to the interface that corresponds to the hands-free transmit register claimed. Claim 1 further claims the speakerphone comprises a first programmable digital attenuator in a speech path and coupled to the microprocessor and to a speaker. Barron discloses a variable gain block (Fig. 4, reference 425; column 4, lines 44-47) that corresponds to the first programmable digital attenuator claimed and is in the speech path between the telephone line (Fig. 1, reference 168; column 3, lines 20-21) and the speaker (Fig. 1, reference 150; column 3, lines 24-26) and is coupled to a processor (Fig. 1, reference 160) that corresponds to the microprocessor claimed. Claim 1 further claims the speakerphone comprises a second programmable digital attenuator in a speech path and coupled to the microprocessor and to a microphone. Barron discloses a variable gain block (Fig. 4, reference 415; column 4, lines 44-47) that corresponds to the second programmable digital

attenuator claimed and is in the speech path between a processor (Fig. 1, reference 115) that corresponds to the microprocessor claimed and a microphone (Fig. 1, reference 105; column 2, line 68 through column 3, line 1) and is coupled to a processor (Fig. 1, reference 160) that corresponds to the microprocessor claimed. Claim 1 further claims the microprocessor determines peak volume levels on both speech paths. Barron discloses measuring (i.e., determining) peak signal (i.e., volume) levels for a first input signal and a second input signal (i.e., both speech paths) (column 2, lines 12-13 and 16-17). Claim 1 further claims the microprocessor adjusts gain levels in the speech paths in response to the peak volume levels. Barron discloses setting gains of variable gain blocks (i.e., adjusting gain levels) in the speech paths (column 5, lines 5-7) in response to peak signal levels (column 4, lines 65-66 and column 5, lines 3-4). Further, Barron discloses gain adjustment to achieve continuously variable output signal levels (column 1, lines 51-56). Because of this continuous variation, in transitioning between the conventional transmit and receive modes, the speakerphone system disclosed Barron necessarily and inherently passes through a mode of operation in which the attenuation on both channels is at a level that allows both the near-end and far-end talkers to talk and hear simultaneously. As stated above under *Claim Rejections - 35 USC § 112*, this conforms to applicant's definition of "duplex" as used in the specification. Therefore, Barron anticipates all elements of Claim 1. While applicant discloses a non-transitional and stable state of operation in which the attenuation on both channels is at a level that allows both the near-end and far-end talkers to talk and hear simultaneously, Claim 1 does not claim such a state.

13. Claim 24 claims a speakerphone arrangement including a microphone and a speaker. Barron discloses a speakerphone system including a microphone (column 2, line 68 through

column 3, line 1) and a speaker (column 3, lines 24-26). Claim 24 further claims a first speech path to the speaker. Barron discloses a path (Fig. 1, reference CH2) from a telephone line (Fig. 1, reference 168; column 3, lines 20-21) to a speaker (Fig. 1, reference 150; column 3, lines 24-26) that corresponds to the first speech path claimed. Claim 24 further claims a second speech path to the microphone. Barron discloses a path (Fig. 1, reference CH1) from a microphone (Fig. 1, reference 105; column 2, line 68 through column 3, line 1) to a telephone line (Fig. 1, reference 123; column 3, lines 7-9) that corresponds to the second speech path claimed. Claim 24 further claims a first programmable digital level adjuster adapted to be controlled to provide a gain adjustment along the first speech path. Barron discloses a variable gain block (Fig. 4, reference 425; column 4, lines 44-47) that corresponds to the first programmable digital level adjuster claimed and is in the speech path between the telephone line (Fig. 1, reference 168; column 3, lines 20-21) and the speaker (Fig. 1, reference 150; column 3, lines 24-26) and is coupled to a processor (Fig. 1, reference 160) that controls the variable gain block (i.e., provides a gain adjustment along the speech path). Claim 24 further claims a second programmable digital level adjuster adapted to be controlled to provide a gain adjustment along the second speech path. Barron discloses a variable gain block (Fig. 4, reference 415; column 4, lines 44-47) that corresponds to the second programmable digital level adjuster claimed and is in the speech path between the telephone line (Fig. 1, reference 123; column 3, lines 7-9) and the microphone (Fig. 1, reference 105; column 2, line 68 through column 3, line 1) and is coupled to a processor (Fig. 1, reference 115) that controls the variable gain block (i.e., provides a gain adjustment along the speech path). Claim 24 further claims a logic decision circuit coupled to the programmable digital level adjusters. Barron discloses a processor (Fig. 1, reference 115,

160) that corresponds to the logic decision circuit claimed and is coupled to the variable gain blocks (Fig. 4, reference 415, 425) that correspond to the programmable digital level adjusters claimed. Claim 24 further claims the logic decision circuit being adapted to regularly determine the respective peak amplitudes of signals in the first and second speech paths. Barron discloses measuring (i.e., determining) peak signal (i.e., volume) levels for a first input signal and a second input signal (i.e., in the first and second speech paths) (column 2, lines 12-13 and 16-17). Claim 24 further claims the logic decision circuit controls the gains of the speech path during full duplex operation by controlling the programmable digital level adjusters. Barron discloses setting gains of variable gain blocks (i.e., controlling the gains) in the speech paths (column 5, lines 5-7) in response to peak signal levels (column 4, lines 65-66 and column 5, lines 3-4). Further, Barron discloses gain adjustment to achieve continuously variable output signal levels (column 1, lines 51-56). Because of this continuous variation, in transitioning between the conventional transmit and receive modes the speakerphone system disclosed Barron necessarily and inherently passes through a mode of operation in which the attenuation on both channels is at a level that allows both the near-end and far-end talkers to talk and hear simultaneously. As stated above under *Claim Rejections - 35 USC § 112*, this conforms to applicant's definition of "full-duplex" as used in the specification. Therefore, Barron anticipates all elements of Claim 24. While applicant discloses a non-transitional and stable state of operation in which the attenuation on both channels is at a level that allows both the near-end and far-end talkers to talk and hear simultaneously, Claim 24 does not claim such a state.

14. Claim 25 claims the arrangement of Claim 24 wherein the logic decision circuit is a microprocessor circuit. As stated above apropos of Claim 24, Barron anticipates all elements of

that claim. In addition, as stated above apropos of Claim 24, Barron discloses a processor that corresponds to the logic decision circuit claimed. Further, Barron discloses implementing the processor on a DSP 56001 digital signal processing integrated circuit (column 1, lines 60-62) that is a microprocessor. Therefore Barron anticipates all elements of Claim 25.

15. Claim 26 claims the arrangement of Claim 24 wherein the logic decision circuit is configured and arranged to dynamically regulate the balance of the speech paths during full duplex operation. As stated above apropos of Claim 24, Barron anticipates all elements of that claim. In addition, Barron discloses calculating gain parameters such that gain in one path decreases as gain in the other path is increased (i.e., dynamically regulating the balance of the speech paths) (column 8, line 56 through column 9, line 28). Therefore, Barron anticipates all elements of Claim 26.

16. Claim 27 claims the arrangement of Claim 24 wherein the logic decision circuit is further adapted to implement automatic gain control and thereby regulate gain proportions on at least one of the two speech paths in a full duplex state. As stated above apropos of Claim 24, Barron anticipates all elements of that claim. In addition, Barron discloses applying automatic gain adjustment (i.e., control) to signals in both of the two speech paths (i.e., at least one of the two speech paths) (column 1, lines 44-56). Therefore, Barron anticipates all elements of Claim 27.

17. Claim 28 claims the arrangement of Claim 24 wherein the logic decision circuit is further adapted to implement automatic gain control and thereby regulate gain proportions along both speech paths in a full duplex state. As stated above apropos of Claim 24, Barron anticipates all elements of that claim. In addition, as stated above apropos of Claim 27, Barron discloses applying automatic gain adjustment (i.e., control) to signals in both of the two speech paths

during transitions between the transmit and receive states. Therefore, Barron anticipates all elements of Claim 28.

18. Claim 29 claims the arrangement of Claim 24 wherein the logic decision circuit is further adapted to operate in a plurality of full duplex substates, each substate defining a different relationship between respective gains of the first and second speech paths. As stated above apropos of Claim 24, Barron anticipates all elements of that claim. Because Barron discloses continuous variation of attenuations in the speech paths during transitions between transmit and receive states, the speakerphone system disclosed by Barron necessarily and inherently operates in a plurality of incrementally different full duplex states. Therefore, Barron anticipates all elements of Claim 29.

19. Claim 30 claims the arrangement of Claim 29 wherein the substates include a first unbalanced gain relationship used in response to the speech volume of the first speech path being less than the speech volume of the second speech path, and a second unbalanced gain relationship used in response to the speech volume of the first speech path being greater than the speech volume of the second speech path. As stated above apropos of Claim 29, the combination of Barron anticipates all elements of that claim. In addition, Barron discloses a state of operation in which transmit gain is decreased and receive gain is increased in response to the receive channel speech signal amplitude (i.e., the volume of the first speech path) being greater than the transmit channel speech signal amplitude (i.e., the volume of the second speech path) (column 10, lines 6-9) and another state of operation in which receive gain is decreased and transmit gain is increased in response to the receive channel speech signal amplitude (i.e., the volume of the first speech path) being less than the transmit channel speech signal amplitude (i.e., the volume

of the second speech path) (column 9, equation 3, 4). Therefore, Barron anticipates all elements of Claim 30.

20. Claim 31 is essentially similar to Claim 30 with the additional element of a balanced gain relationship. As stated above apropos of Claim 30, Barron anticipates all elements of that claim. Because Barron discloses continuous variation of attenuations in the speech paths during transitions between transmit and receive states, the speakerphone system disclosed by Barron necessarily and inherently passes through a state where transmit and receive attenuations are equal (i.e., gain is balanced). Therefore, Barron anticipates all elements of Claim 29.

21. Claim 32 claims the arrangement of Claim 24 wherein the logic decision circuit is further adapted to implement automatic gain control using hysteresis and thereby regulate gain proportions along both speech paths in a full duplex state. As stated above apropos of Claim 24, Barron anticipates all elements of that claim. In addition, as stated above apropos of Claim 28, Barron discloses implementation of automatic gain control on both speech paths. Further, Barron discloses the use of hysteresis (column 6, lines 1-10) in implementing the gain control. Therefore, Barron anticipates all elements of Claim 32.

22. Claim 33 is essentially similar to Claim 31 and is rejected for the reasons stated above apropos of Claim 31.

23. Claim 34 claims the arrangement of Claim 24 wherein the logic decision circuit is further adapted to operate in a plurality of full duplex substates, transitioning between substates in response to volume levels in the speech paths and the current substate. As stated above apropos of Claim 24, Barron anticipates all elements of that claim. In addition, as stated above apropos of Claim 30, Barron discloses transitions based on volume levels. In addition, Barron discloses

transitioning based on current operating mode (i.e., substate) (column 10, lines 12-16). Therefore, the combination teaches all elements of Claim 34.

24. Claim 35 is essentially similar to Claim 24 and is rejected for the reasons stated above apropos of Claim 24.

25. All elements of Claim 36 are comprehended by Claim 24. Therefore, Claim 36 is rejected for the reasons stated above apropos of Claim 24.

26. Claim 37 is essentially similar to Claim 32 and is rejected for the reasons stated above apropos of Claim 32.

27. Claims 24, 35 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by McCaslin et al. (US Patent 5,668,794).

28. Claim 24 claims a speakerphone arrangement including a microphone and a speaker. McCaslin discloses a speakerphone system (Fig. 1; Fig. 19) comprising a microphone (Fig. 19, reference 26) and a speaker (Fig. 19, reference 24). Claim 24 further claims the arrangement comprises a first speech path to the speaker. McCaslin discloses a speech path (Fig. 1, reference 10, 12; Fig. 19, reference 400, 410, 16, 22) to the speaker (Fig. 19, reference 24). Claim 24 further claims the arrangement comprises a second speech path to the microphone. McCaslin discloses a speech path (Fig. 1, reference 15, 48; Fig. 19, reference 402, 412, 44, 38, 36, 34, 30, 28) to the microphone (Fig. 19, reference 26). Claim 24 further claims the arrangement comprises a first digital level-adjuster adapted to be controlled to provide a gain adjustment along the first speech path. McCaslin discloses a variable attenuator (Fig. 19, reference 410; column 21, lines 41-42) that corresponds to the first programmable digital level adjustor claimed

and is in the speech path to the speaker (Fig. 19, reference 24) and is controlled to insert attenuation (i.e., provide gain adjustment) in that path (column 21, lines 41-52). Claim 24 further claims the arrangement comprises a second digital level-adjuster adapted to be controlled to provide a gain adjustment along the second speech path. McCaslin discloses a variable attenuator (Fig. 19, reference 412; column 21, lines 43-45) that corresponds to the second programmable digital level adjustor claimed and is in the speech path to the microphone (Fig. 19, reference 26) and is controlled to insert attenuation (i.e., provide gain adjustment) in that path (column 21, lines 41-52). Claim 24 further claims the arrangement comprises a logic decision circuit coupled to the programmable digital level adjusters. McCaslin discloses an echo suppressor (Fig. 19, reference 414) that corresponds to the logic decision circuit claimed and is coupled to the variable attenuators (Fig. 19, reference 410, 412) that correspond to the programmable digital level adjusters claimed. Claim 24 further claims the logic decision circuit being adapted to regularly determine the respective peak amplitudes of signals in the first and second speech paths and control the gains in the paths by controlling the programmable digital level adjusters during full duplex operation. McCaslin discloses setting the attenuators in response to a power ratio derived from peak signal levels (column 22, line 66 through column 23, line 20) during full duplex operation (column 21, lines 62-67). Therefore, McCaslin anticipates all elements of Claim 24.

29. Claim 35 is essentially similar to Claim 24 and is rejected for the reasons stated above apropos of Claim 24.

30. Claim 36 claims a method of controlling an audio signal level in a portable communications device having a first speech path to a speaker and a second speech path to

microphone. McCaslin discloses a variable gain echo suppressor (Fig. 19, reference 414; column 21, lines 53-56) that controls attenuators (Fig. 19, reference 410, 412; column 21, lines 41-45 and 58-62), therefore controlling audio signal levels and has a receive path (Fig. 19, reference 400, 410, 16, 22, 24; column 21, lines 41-42) to a speaker (Fig. 19, reference 24) that corresponds to the speech path to a speaker claimed and a transmit path (Fig. 19, reference 402, 412, 34, 30, 28, 26; column 21, lines 42-45) to a microphone (Fig. 19, reference 26) that corresponds to the speech path to a microphone claimed. Claim 36 further claims the method comprises determining regularly the respective peak amplitudes of signals in the first and second speech paths. McCaslin discloses estimating over predetermined sample times (i.e. regularly) near end and far end peak power levels (column 3, lines 59-64) that corresponds to determining peak amplitudes for signals in the first (far end) and second (near end) speech paths. Claim 36 further claims controlling the gains of the respective first and second speech paths during full duplex operation responsive to the peak amplitudes. McCaslin discloses controlled variable attenuators in the speech paths (Fig. 19, reference 410, 412; column 21, lines 49-52) that control gains in the speech paths in response to the detected peak power (column 4, lines 5-7) during full duplex operation (column 21, lines 62-66). Therefore, McCaslin anticipates all elements of Claim 36.

Claim Rejections - 35 USC § 103

31. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

32. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCaslin in view of Barron. Claim 1 claims a duplex portable handset speakerphone comprising a microprocessor. McCaslin discloses a speakerphone system (Fig. 1; Fig. 19) comprising an echo suppressor (Fig. 19, reference 414) that corresponds to the microprocessor claimed. Claim 1 further claims the speakerphone comprises a hands-free receive register coupled to the microprocessor. McCaslin discloses the echo suppressor receiving a far-end signal (column 21, lines 53-54), a function that inherently requires a structure that corresponds to the hands-free receive register claimed. Claim 1 further claims the speakerphone comprises a hands-free transmit register coupled to the microprocessor. McCaslin discloses the echo suppressor receiving a near-end signal (column 21, lines 54-56), a function that inherently requires a structure that corresponds to the hands-free transmit register claimed. Claim 1 further claims the speakerphone comprises a first analog-to-digital converter coupled to the hands-free receive register. McCaslin discloses an analog-to-digital converter (Fig. 1, reference 12; column 5, lines 36-39) that corresponds to the first analog-to-digital converter claimed and is coupled to the echo suppressor via the Rin(k) signal. Claim 1 further claims the speakerphone comprises a second analog-to-digital converter coupled to the hands-free transmit register. McCaslin discloses an analog-to-digital converter (Fig. 19, reference 34; column 5, lines 47-49) that corresponds to the second analog-to-digital converter claimed and is coupled to the echo suppressor. Claim 1 further claims the speakerphone comprises a first programmable digital attenuator in a speech path and coupled to the microprocessor and to a speaker. McCaslin discloses a variable attenuator (Fig. 19, reference 410; column 21, lines 41-42) that corresponds to the first programmable digital attenuator claimed and is in the speech path to the speaker (Fig. 19,

reference 24) and is coupled to the echo suppressor that corresponds to the microprocessor claimed. Claim 1 further claims the speakerphone comprises a second programmable digital attenuator in a speech path and coupled to the microprocessor and to a microphone. McCaslin discloses a variable attenuator (Fig. 19, reference 412; column 21, lines 43-45) that corresponds to the second programmable digital attenuator claimed and is in the speech path to a microphone (Fig. 19, reference 26) and is coupled to the echo suppressor that corresponds to the microprocessor claimed. Claim 1 further claims the microprocessor determines peak volume levels on both speech paths. McCaslin discloses determining far end (column 22, lines 9-10) and near end (column 22, lines 36-38) signal power using peak signal. Claim 1 further claims the microprocessor adjusts gain levels in the speech paths in response to the peak volume levels. McCaslin discloses setting the attenuators in response to a power ratio derived from peak signal levels (column 22, line 66 through column 23, line 20). Further, McCaslin discloses attenuation adjustment to achieve full duplex communication (column 21, lines 62-67). Claim 1 further claims the speakerphone comprises a memory circuit having an algorithm executable by the microprocessor for operating the speakerphone. While McCaslin discloses an echo suppressor that functions as the microprocessor claimed and a method of setting attenuation that corresponds to the algorithm claimed, McCaslin fails to explicitly disclose certain specific elements claimed, namely the microprocessor, memory circuit and algorithm storage. As stated above apropos of Claim 1 under *Claim Rejections - 35 USC § 102*, Barron discloses the microprocessor and storage of an algorithm in a memory that correspond to these claimed elements. It would have been obvious to one skilled in the art at the time of the invention to apply the microprocessor, memories and algorithm storage taught by Barron to the echo

suppressor taught by McCaslin for the purpose of implementing the echo suppressor in a physical platform.

33. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barron in view of Chen et al. (US Patent 5,075,687). Claim 2 is essentially similar to Claim 1 with the exception that Claim 2 additionally claims a pre-amplifier coupled to the microprocessor, a codec instead of analog-to-digital converters and consolidation of the microprocessor, hands-free registers, pre-amplifier, codec and attenuators on an integrated circuit controller chip. As stated above apropos of Claim 1, Barron anticipates all elements of that claim. In addition, the analog-to-digital and digital-to-analog converter combinations disclosed by Barron (Fig. 1, references 110, 150, 165, 120) constitute codecs. Therefore, Barron anticipates all elements of Claim 2 with the exception of a pre-amplifier coupled to the microprocessor and consolidation of the microprocessor, hands-free registers, pre-amplifier, codec and attenuators on an integrated circuit controller chip. Chen discloses integration of the speakerphone hardware on a single integrated circuit (column 2, lines 20-22; column 1, lines 25-44) that corresponds to the integrated circuit controller chip claimed. It would have been obvious to one skilled in the art at the time of the invention to apply integration as taught by Chen to the circuit disclosed by Barron for the purpose of reducing cost and improving stability, sensitivity and consistency. Therefore the combination of Barron and Chen is shown to teach all elements of Claim 2 with the exception of a pre-amplifier coupled to the microprocessor. Chen discloses a booster amplifier (Fig. 1, reference 28; column 3, lines 3-7) that corresponds to the pre-amplifier claimed and is coupled to a control circuit that corresponds to the microprocessor claimed. It would have been obvious to one skilled in the art

at the time of the invention to apply the booster amplifier taught by Chen to the combination taught by Barron and Chen for the purpose of increasing the signal-to-noise ratio of the input to the analog-to-digital converter.

34. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barron in view of Chen as applied to Claim 2 above, and further in view of Teitler et al. (US Patent 5,722,086). Claim 4 claims the system of Claim 2, further including a base station comprising an integrated circuit controller chip comprising a codec, a telephone line interface and a radio frequency interface. As stated above apropos of Claim 2, the combination of Barron and Chen meets all elements of that claim. Therefore, the combination meets all elements of Claim 4 with the exception of a base station comprising an integrated circuit controller chip comprising a codec, a telephone line interface and a radio frequency interface. Teitler discloses a system including a base station (Fig. 1, reference 14; column 2, lines 9-12) comprising a microcontroller unit (Fig. 1, reference 28; column 2, lines 39-46) that corresponds to the controller claimed, an ADPCM decoder and ADPCM decoder D/A combination (Fig. 1, reference 26, 34; column 2, lines 31 through 39) that corresponds to the codec claimed, an output signal to a telephone system (column 2, lines 54-57) that corresponds to the telephone line interface claimed, and an RF interface (Fig. 1, reference 24; column 2, lines 34-39) that corresponds to the radio frequency interface claimed. It would have been obvious to one skilled in the art at the time of the invention to apply the RF and telephone interface functions and the codec and controller functions as taught by Teitler to the combination taught by Barron and Chen for the purpose of making the full duplex speakerphone cordless. Therefore, the combination of Barron, Chen and

Teitler is shown to meet all elements of Claim 4 with the exception of the codec function being included in a controller chip. Teitler discloses the combination of codec and control functions on an ADPCM CODEC chip (column 3, lines 41-44). It would have been obvious to one skilled in the art at the time of the invention to apply the ADPCM CODEC chip as taught by Teitler to the combination taught by Barron, Chen and Teitler for the purpose of reducing the size and component count of the base unit.

35. Claims 7 through 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barron in view of Teitler.

36. All elements of Claim 7 are comprehended by Claim 1 with the exception that Claim 7 claims a ROM containing a stored operation algorithm for directing the microprocessor and a radio frequency interface at one end of each speech path. As stated above apropos of Claim 1, Barron anticipates all elements of that claim. In addition, Barron discloses a ROM (Fig. 1, reference 130) for storing software to implement the speakerphone functions (column 10, lines 48-52). Therefore Barron anticipates all elements of Claim 7 with the exception of a radio frequency interface at one end of each speech path. Teitler discloses an RF interface (Fig. 1, reference 22; column 2, lines 12-16) that corresponds to the radio frequency interface claimed. It would have been obvious to one skilled in the art at the time of the invention to apply an RF interface as taught by Teitler to the system taught by Barron for the purpose of making the speakerphone-cordless.

37. Claim 8 claims the method of Claim 7 wherein the stored operation algorithm uses software timers and peak detection. As stated above apropos of Claim 7, the combination of

Barron and Teitler meets all elements of that claim. In addition, Barron discloses peak detection (column 2, lines 12-13 and 16-17) and determination of peak speech amplitude during a prescribed interval (column 5, lines 31-34 and 44-48) the use of software timers being well known in the art, it would have been obvious to one skilled in the art at the time of the invention to apply software timers to the combination of Barron and Teitler for the purpose of determining the interval disclosed by Barron.

38. Claim 9 claims the method of Claim 8 wherein a software timer generates a hardware interrupt to the microprocessor every speech frame so that one of the hands-free registers can be read by a software peak detector. As stated above apropos of Claim 8, the combination of Barron and Teitler meets all elements of that claim. Therefore, the combination of Barron and Teitler is shown to meet all elements of Claim 9 with the exception of a software timer generating a hardware interrupt to the microprocessor every speech frame. Barron discloses performing addition on consecutive speech samples (i.e., every speech frame) (column 5, lines 40-42). Examiner takes Official Notice of the fact that software timer generated hardware interrupts were well known in the art. It would have been obvious to one skilled in the art at the time of the invention to use a software timer generated hardware interrupt as was well known in the art in the combination taught by Barron and Teitler for the purpose of signaling the microprocessor to read and add each new speech sample.

39. Claims 20 through 23 are rejected for reasons stated in the prior Office action mailed on 29 December 1998, paper no. 16, repeated in Examiner's answer mailed on 24 November 1999,

paper no. 24 and affirmed in Board of Patent Appeals and Interferences decision mailed on 27 August 2002, paper no. 25.

Conclusion

40. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nashino et al. (US Patent 4,513,177) teaches a speakerphone system that passes through intermediate gain states during which both talkers can talk and hear simultaneously (Fig. 2; column 8, line 61 through column 9, line 6). Odhams (GB 2 174 578 A) discloses a similar transitional state (Page 1, lines 31-34). Brown (US Patent 3,953,676) discloses a similar relationship of attenuations (Fig. 2; column 3, line 66 through column 4, line 2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Swerdlow whose telephone number is 703-305-4088. The examiner can normally be reached on Monday through Friday between 8:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forrester Isen can be reached on 703-305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

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February 4, 2003

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